2.1.151 c.2

CANADIANA

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ERCB

Energy Resources Conservation Board

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Informational Letter

IL 91-1

TO: All Oil and Gas Operators

29 January 1991

APPLICATIONS FOR APPROVAL OF GAS PROCESSING SCHEMES – POLICY ON PLANT PROLIFERATION

This informational letter replaces IL 90-5 issued 23 October 1990. It contains revisions to the paragraph on ***DRAINAGE AND INTRA-POOL EQUITY*** *on page 2 of the attachment to correct and clarify statements respecting the effective date for common purchaser, common carrier, common processor, and rateable take orders.*

This informational letter is to clarify the Board's current position on the development of new gas plants and the need to avoid plant proliferation. The primary objective of this new focus is to provide some assurance that applicants have investigated the feasibility of using existing plants when examining potential gas processing options. No new legislation or changes to existing regulations are contemplated.

The growth in resource development over the past decade has generated increased public awareness of the potential for industrial impact throughout the province. From many submissions made to the Board it is clear that the public is reacting in an adverse way to new industrial facilities. New facilities commonly create land-use conflicts and prompt concern about local environmental and social impacts. Applicants for new facilities frequently argue that despite these impacts they are compelled to build such facilities because of inordinate custom processing fees charged by existing plants in the area.

To ensure these concerns are addressed, the Board intends to continue to promote an approval process that enhances conflict resolution at the local level from the outset of the planning process, and to encourage increased use of existing facilities where local concerns about industrial impact cannot be overcome. In general, the Board believes developers of new gas processing plants should recognize and strike a balance between various public interest issues, and decisions should not be tailored exclusively to suit individual resource ownership in the area or dominated by a desire, on the part of individual companies, to control processing plants. As outlined in the attached guidelines, the Board expects operators will vigorously explore all reasonable options to use existing gas processing plants in the area and expects these efforts to be documented in support of an application to expand or add new facilities. The Board appreciates that there can be many factors which make a new plant preferable to using an existing one and will not preclude its development if the circumstances warrant a new facility. Each application will continue to be evaluated on its own merits.

The Board is convinced that pro-active negotiation within the industry and recognition of public interest issues in the development process will lead to more optimum use of facilities. It is also prepared to assist industry and the public in resolving problems if that is of some benefit.

While the objective of this policy applies to all gas plants, the Board observes that the problem of plant proliferation largely relates to new facilities with capacities below 500×10^3 m^3/d.

Questions respecting this matter can be directed to Mr. Jim Dilay of the Board's Gas Department at 297-8506 or Mr. Bill Schnitzler at 297-7322.

P.J. Mink
Vice Chairman

Attachment

ATTACHMENT TO IL 91-1

GAS PROCESSING PLANT APPLICATIONS: INFORMATION REQUIREMENTS ON FACTORS RESPECTING THE FEASIBILITY OF USING EXISTING OR EXPANDED PLANTS

The following presents the Board's views on several factors respecting the feasibility of using an existing gas processing plant as opposed to building a new one.

PUBLIC CONSULTATION

The Board believes that involvement by the public directly affected by new facilities should be an integral component of facilities planning. Guidelines on how that may be accommodated are outlined in ERCB Informational Letter IL 89-4[1].

AVAILABILITY OF EXISTING GAS PLANT CAPACITY

Section 15.050(3)(w) of the Oil and Gas Conservation Regulations specifies that an application for approval of a gas processing scheme must include a general description of the feasibility of using a single larger plant in the area rather than two or more smaller plants or the feasibility of expanding a nearby existing gas processing plant to handle the additional gas.

If existing plants do not or will not have sufficient capacity to process the additional gas, the Board will require historical statistics and production forecasts to demonstrate the lack of capacity. Applicants for new plants will be asked to address the technical and economic feasibility of expanding an existing plant to provide the required additional capacity. Where adequate capacity exists or could be readily obtained through expansion of an existing plant, applicants will be asked to document the efforts that have been made to secure processing arrangements, confirm in writing the terms of those negotiations, and provide details as to why the terms were found to be unsuitable. If it is not feasible or desirable to expand an existing plant, applicants for new plants must provide a detailed comparison of the technical, environmental, economic, and other factors between the two options.

LACK OF UP-TO-DATE TECHNOLOGY FOR SULPHUR AND LIQUIDS RECOVERY

Older plants may not be capable of achieving the degree of processing efficiency available from newer plants having more up-to-date technology. This is particularly true for sulphur recovery, which is a very significant environmental issue, and liquids recovery, which can have a significant impact on project economics. The requirements for sulphur recovery are set out in Informational Letter IL 88-13[2], including those cases where gas is being added to an existing plant or an expanding plant.

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[1] Energy Resources Conservation Board and Alberta Environment. Public Involvement in the Development of Energy Resources.

Applicants may resist using existing plants if the addition of gas to the existing plant would necessitate the addition of sulphur recovery or would require increased sulphur recovery to meet the province's guidelines. The Board expects the new guidelines to be met whether or not a new or existing plant is under consideration and recognizes that in most cases the addition or upgrading of sulphur recovery will be required regardless of whether or not existing or new facilities are developed. It also recognizes that in some cases the cost of adding or upgrading sulphur recovery at an existing plant may be significantly greater than the cost to achieve the required sulphur recovery in a new plant, and may therefore make upgrading the existing plant uneconomic.

With respect to liquids recovery, the Board would need to be convinced that the increase in liquids recovery, having regard for the capability of the straddle plants on the NOVA system, is sufficiently greater than the status quo to warrant the requested approval for a new plant.

TRANSPORTATION ON THE NOVA SYSTEM

In some cases an existing plant cannot be used as there is insufficient firm NOVA transportation available on the existing lateral; provision of firm capacity cannot be made in time to prevent substantial drainage or to meet the sales contract conditions. In general, the Board would expect the planning process and regulatory process to be sufficiently advanced to avoid transportation conflicts. The Board is well aware, however, of the difficulties which currently exist in acquiring capacity on the NOVA system. To circumvent the problem, NOVA has offered to give special consideration to resolve the matter where, in the view of the Board, plant proliferation or resource conservation such as the recovery of solution gas is a particular public interest issue. The Board believes that NOVA capacity is a short-term constraint that must be measured against the long-term consequences of adding a new facility. Applicants for new gas plants claiming a transportation constraint will be requested to document the results of their discussions with NOVA as part of an application. This should include evidence showing that NOVA capacity is not available and under what circumstances it would be.

DRAINAGE AND INTRA-POOL EQUITY

With respect to drainage concerns, the Oil and Gas Conservation Act includes provisions for the Board to issue common purchaser, common carrier, common processor, and/or rateable take orders where it is convinced that such orders are necessary to allow each owner in a pool an opportunity to produce his share of reserves. (A rateable take order would be effective only on the date the order is issued, while the effective date of a common purchaser, common carrier, or common processor order could be made retroactive to the date of the application if deemed appropriate by the Board.) The Board expects these options to be considered in an effort to resolve equity problems at an existing plant prior to an application being made for a new plant.

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[2] Energy Resources Conservation Board and Alberta Environment, August 1988. Sulphur Recovery Guidelines – Gas Processing Operations. Informational Letter IL 88-13. Calgary, Alberta.

CAPACITY REQUIREMENTS FOR PROJECTED DRILLING SUCCESSES

The Board recognizes that it is prudent that consideration be given to the prospects for future processing needs in the area. Indeed, the provision of some spare capacity in new plants, while it may give the appearance of plant underutilization for the initial period, might avoid a proliferation problem later. At the same time it must be recognized that spare processing capacity will emerge at existing plants as proven reserves are depleted. In new plant applications where a plant already exists, the Board expects applicants to provide sufficient evidence to show that new resource development and markets will likely exceed the available capacity in the area in the long term.

CUSTOM PROCESSING FEES

It is well understood that access to existing plants and a fair fee for custom processing are vital elements to avoid plant proliferation. The Board notes that, in response to a request from the Honourable R. Orman, Minister of Energy, a joint industry task force produced a report, "Gas Processing Fee Guidelines – Jumping Pound 1990 (JP-90)". These guidelines are designed to promote negotiation of fees and contemplate an arbitration process that could be used to more expediently settle disputes. While the Board has no jurisdiction in the matter of processing fees, it notes that the Public Utilities Board (PUB) under the Gas Utilities Act has jurisdiction to deal with complaints respecting processing fees. Therefore, the Board takes the position that, if an unacceptable processing fee is demanded by the existing plant operator, this may not necessarily preclude the use of the plant, as there is recourse available through the PUB to resolve the dispute.

REFERENCES

Recent gas plant applications and Board positions related to plant proliferation that may be helpful to the reader are:

	Company	Application	Decision Report
1.	Hewitt Oil (Alberta) Ltd.	850583	D 86-3
2.	Chevron Canada Resources Limited	871060	D 88-8
3.	Chevron Canada Resources Limited	871435	D 88-9
4.	Norcen Energy Resources Limited	861041	D 88-22
5.	Universal Explorations Ltd.	870772	D 88-23
6.	Unocal Canada Management Limited	880830	D 89-7
7.	Altex Resources Ltd.	891425	D 90-6
8.	Shell Canada Limited Husky Oil Operations Ltd.	890971 (Proceeding)	D 90-8

9. "The ERCB Position on Gas Plant Proliferation": presented by F. J. Mink to Info-Tech Gas Plant Optimization Conference, 7 June 1989, Calgary, Alberta.

CANADIANA

MAR 18 1991

ERCB

Energy Resources
Conservation Board

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Informational Letter

IL 91-2

TO: All Oil and Gas Operators

7 March 1991

SOUR GAS FLARING REQUIREMENTS AND CHANGES TO REGULATIONS

The purpose of this informational letter is to summarize the Board's requirements for the temporary flaring of sour gas as set out in the Oil and Gas Conservation Regulations, and to inform all oil and gas operators of changes to the regulations affecting these requirements.

Previously, when the gas produced from a well containing more than 10 moles per kilomole of hydrogen sulphide was to be flared during any test, during any period of cleaning out the well, or during well servicing operations, the licensee was required to obtain from the Board written approval of the method, stack height, and equipment to be used to flare the gas.

The ERCB has determined that the minimum flare stack height requirement of 12 metres is capable of ensuring adequate dispersion of sulphur dioxide produced as a result of flaring under all circumstances, provided the hydrogen sulphide content does not exceed 50 moles per kilomole. As a result, a sour gas flaring application will be required only if the gas to be flared from a well contains more than 50 moles per kilomole of hydrogen sulphide. An application to flare gas containing more than 50 moles per kilomole of hydrogen sulphide must be in accordance with section 15.240 of the Oil and Gas Conservation Regulations.

Flaring of sour gas containing 10 to 50 moles per kilomole of hydrogen sulphide may be conducted without application to or written approval of the Board, provided the requirements set out in the Oil and Gas Conservation Regulations and summarized in Appendix 1 of this letter are met. If it is found that an operator has not met these requirements prior to or during flaring of any gas, operations may be suspended by a representative of the Board.

Operators conducting flaring of sour gas containing less than 10 moles per kilomole of hydrogen sulphide are also encouraged to review and implement the requirements specified in Appendix 1. If odour complaints are received by the Board as a result of these flaring operations, some of the conditions specified in Appendix 1 may be requested by a representative of the Board.

The conservation aspects of solution gas flaring are dealt with separately in Informational Letter IL 81-24, and are not changed by this informational letter.

In the case of a critical sour well, a sour gas flaring application must be submitted regardless of the hydrogen sulphide content. All other related operational and safety related requirements set out in Interim Directive ID 90-1 must also be met prior to conducting any flaring operations.

Brian F Bietz

B. F. Bietz, Ph.D.
Board Member

Attachments

REGULATION CHANGES
OIL AND GAS CONSERVATION AMENDMENT REGULATION

1. *The Oil and Gas Conservation Regulations (Alta. Reg. 151/71) are amended by this Regulation.*

2. *The following is added after section 7.050:*

Section 7.055

(1) Where gas

(a) from a well that produces gas containing more than 50 moles per kilomole of hydrogen sulphide, or

(b) from a well designated as a critical well

is flared during any test, during any period of cleaning out the well or during well servicing operations, the licensee shall obtain written approval of the Board of the method, stack height and equipment to be used to flare the gas.

(2) An application submitted under subsection (1) shall be in accordance with section 15.240.

3. *Section 7.060 is amended*

(1) by adding the following after subsection (1):

Subsection 1.5

Where no gas analysis has been taken from the well within the preceding 12-month period, gas from the formation produced at the well shall be tested at the commencement of flaring to determine the hydrogen sulphide content.

(2) By repealing subsections (5) and (6).

(3) By adding the following after subsection (9):

Subsection 9.5

At least 24 hours in advance of any flaring operations, notice shall be given

(a) to the Board Area Office,

(b) for oil wells, to all rural residents and administrators of any incorporated centres or hamlets within a 1.5 kilometre radius of the well, and

(c) for gas wells, to all rural residents and administrators of any incorporated centres or hamlets within a 3 kilometre radius of the well.

4. *Section 8.148(4) and (5) are repealed.*

5. *Section 15.240 is repealed and the following is substituted:*

Section 15.240

(1) An application under section 7.055 for approval of the method, stack height and equipment used to flare gas containing more than 50 moles per kilomole hydrogen sulphide, shall include

(a) the dimensions of the proposed stack (height and diameter),

(b) a map showing the location of the well, limits of any incorporated centres, rural residences, and recreation areas within a 3 kilometre radius of the well site, and a 1:50 000 scale topographic map showing a minimum radius of 7 kilometres from the well site,

(c) if the area with a distance of 100 times the stack height is more than 50 per cent treed, the average tree height and the distance from the nearest trees to the base of the stack,

(d) the maximum, minimum, and average rates at which the well will be flowed,

(e) the total volume of gas to be flared,

(f) a description of the type of operations to be performed that will require the flaring, detailing any well test design parameters, and justification for the flare rates and volumes requested,

(g) the most recent analysis on a condensate-free basis of the gas from the well in questions, or if a gas sample from the well is not available, an analysis of gas from the same pool,

(h) the anticipated rate of liquid production,

(i) a description of the method of handling and transporting the liquid production from the well,

(j) the battery name and location of the facility to which the liquids from the well will be transported, and

(k) a statement as to whether the well has been designated as a critical or non-critical sour well.

These amendments will be effective immediately for all temporary sour gas flaring operations. If any further information regarding these changes or the requirements is needed, please call the Board's Environment Protection Department at 297-3186.

APPENDIX 1

FLARING REQUIREMENTS
WELLS CONTAINING 10 TO 50 MOLES PER KILOMOLE OF HYDROGEN SULPHIDE

Flaring of sour gas containing 10 to 50 moles per kilomole of hydrogen sulphide may be conducted without written approval of the Board. To ensure that flaring operations at wells producing gas containing 10 to 50 moles per kilomole of hydrogen sulphide are conducted in accordance with the Regulations, the following requirements must be adhered to:

(a) The stack must be at least 12 metres in height, and must be equipped with an automatic igniter or a continuous pilot.

(b) If a recent gas analysis (taken within a 12-month period) for the well is not available, an on-site H_2S analysis (conducted by Tutweiler or gas chromatography methods) must be conducted upon commencement of flaring. If the hydrogen sulphide content is found to exceed 50 moles per kilomole, operations must be suspended and a written application to flare the gas must be submitted to the Board.

(c) The total volume of gas being flared, including clean-up volumes, must not exceed $600 \times 10^3 m^3$.

(d) Notice of flaring or clean-up must be given to the appropriate Board Area Office at least 24 hours in advance. Such notice must detail whom to contact in cases of complaints or emergencies, and the appropriate telephone numbers.

(e) Fluid volumes and fuel consumption must be recorded and reported in the normal manner on S1, S2 or S8 forms. If unable to record on S-forms, a written report containing this information must be submitted to the Board's Gas Department within 30 days of the flaring completion date.

(f) Normal low stage separation equipment is required where sour liquids are produced.

(g) The storage tanks must have restricted flow style hatches with tight fitting seals, and the tank vapours must be collected and burned at the flare stack.

(h) Identification and warning signs must be posted on lease, in accordance with section 6.020 of the Oil and Gas Conservation Regulations.

(i) The tanks must be diked, unless prior approval has been obtained from the appropriate Board Area Office.

(j) The equipment spacing must conform to the Oil and Gas Conservation Regulations.

(k) If any complaint is received during flaring operations, the operator must notify the appropriate Board Area Office immediately, and then conduct an investigation. If the source and cause of the complaint cannot be determined and rectified immediately, operations may be suspended by a representative of the Board.

(l) For well tests, Guide G-40 "PRESSURE AND DELIVERABILITY TESTING OIL AND GAS WELLS - Minimum Requirements and Recommended Practices" must be observed with the results submitted to the appropriate Board department within 3 months of the flaring completion date.

(m) For gas wells, all rural residences and the administrators of any incorporated centres or hamlets within at least a 3 kilometre radius, must be notified prior to the commencement of any flaring operations.

(n) For gas wells, drawdowns must be restricted in accordance with the Board's manual entitled "Theory and Practice of Testing Gas Wells" (most recent edition).

(o) For oil wells, if the production test period is to exceed 14 days in duration, an application for a temporary battery must be submitted to the Board's Drilling and Production Department.

(p) For oil wells, all rural residences and the administrators of any incorporated centres or hamlets within at least a 1.5 kilometre radius, must be notified prior to the commencement of any flaring operations.

CANADIANA

ERCB

Energy Resources
Conservation Board

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Informational Letter

IL 91-3

15 February 1991

WELL PRODUCTION RECORDS AND S-4 SUBMISSIONS

The Board has determined that there are ongoing difficulties and problems relating to late submissions of **ERCB Form S-4: Notice of Commencement or Suspension of Production or Injection at a Well**. Sections 3.020 and 12.020 of the Oil and Gas Conservation Regulations require that this form be submitted upon change in status. If there are multiple completions within a single well, S-4s are required for each producing zone. In cases of suspension, reference should also be made to ERCB Interim Directive ID 90-4, Suspension Guidelines for Inactive Wells, which details safe suspension requirements.

The S-4 is referred to in detail in ERCB Guide G-7, the Production Accounting Handbook. Operators are also reminded that an S-4 may be required by a monthly "Operator Audit Report" which is sent to companies which report S-1 production and/or S-18 injection data which is inconsistent with the current wells' status. It has been noted that S-4s are often submitted by different company personnel than those who file other related "S" reports. Good communication within different company departments, including field operations, is therefore needed to ensure proper well records management.

In a recent Board decision report (D 90-19), significant problems resulting from erroneous production reporting were noted to have occurred because of non-filing of the appropriate S-4. Failure to submit the S-4 in a timely manner creates significant problems in maintaining true and accurate production records not only for the ERCB, but also for the Department of Energy and the industry at large.

The Board therefore requests that operators review their existing well records procedures to avoid potential problems relating to this issue, and reminds operators that timely and accurate records are in everyone's best interests. Questions concerning S-4s should be directed to Evelyn Boyd of the ERCB Well Records Section at 297-2596.

R. T. Bording
Manager, Accounting

ERCB

Energy Resources Conservation Board
640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Informational Letter

IL 91-4

TO: All Pipeline Operators

CANADIANA
APR - 8 1991

25 March 1991

THE USE OF CONCRETE SLABS AT PIPELINE CROSSINGS OF HIGHWAYS AND ROADS

With the continued growth in population in Alberta, there is continual pressure on the road authorities to improve the road and highway systems. When this is coupled with the existing extensive pipeline network, interaction between the two systems is inevitable. To provide for continued safety, any pipeline affected by road widening, road re-alignment, or other road works must be upgraded or receive special treatment to accommodate the extra stresses due to road loadings.

Acceptability of Concrete Slabs for Pipeline Protection

The design of new pipelines crossing highways and roads is governed by the Canadian Standards Association (CSA) pipeline standards. Clause 5.4 in CSA Z184-M86 and clause 5.8 in CSA Z183-M90 provide design requirements for cased and uncased crossings. They do not allow the use of concrete slabs for the control of stress in new pipelines.

However, recent developments in the CSA standards allow the installation of load-bearing structures as an acceptable method of protecting an existing pipeline when required by population encroachment or other change of environment, such as road or highway improvements. The Energy Resources Conservation Board (the Board) interprets "load-bearing structures" to include pre-cast or cast-in-place concrete slabs. The following procedure was developed to achieve orderly and consistent treatment when concrete slabs are proposed as a method of distributing the traffic load.

Procedure for Review of Design

Two critical aspects of the use of concrete slabs are the capability of the slab to withstand road traffic loads and the capability of the slab to reduce the stress transmitted to the pipeline to an acceptable level. Consequently, the design of a slab installation must be reviewed from both aspects. In all future applications to install concrete slabs the Board will review the design from the pipeline stress aspect and Alberta Transportation and Utilities (ATU) or the appropriate County or Municipal District (the road authorities) will review the design from the traffic loading aspect.

To achieve an orderly review the Board and the road authorities have developed a procedure which, effective immediately, will be followed for any such installation. The procedure is described in Attachment 1 to this letter.

A Slab Design Acceptable Under Certain Conditions

The Board and the road authorities have reviewed the slab design shown in Attachment 2 and believe it would be acceptable for all axle loads likely to be encountered in Alberta, for a burial depth of slab up to 4 m, and for pipelines up to 324-mm outside diameter (NPS 12). Given the variability of conditions associated with the installation of a slab it is not feasible to design an all-purpose slab. The design offered uses the principle of transmitting zero stress to the pipeline provided the slab and the pipeline are separated by a vertical distance of 300 mm minimum and 500 mm maximum, within construction tolerances. Pipeline companies intending to utilize this design shall satisfy themselves that it is suitable for the particular application. Companies should refer to the General Notes listed on Attachment 2 for acceptable soil-bearing and other conditions. For pipelines greater than 324 mm in diameter, or where the site conditions do not allow the use of this design, the pipeline company shall design the slab installation.

Sharing of Costs

The Board and the road authorities recognize that the Canadian standards do not mandate any particular method to use in these situations and are aware that a company may not wish to meet CSA requirements for its pipeline by the use of slabs. However, ATU has experienced substantial cost reductions in applying concrete slabs as an alternative to extending casing or installing thicker-wall pipe when required by highway construction activities.

The Board encourages negotiations between the road authority and the company to determine a mutually satisfactory method of complying with the CSA requirements in the most cost-effective way. If agreement cannot be reached either party may apply to the Board for direction under section 34 of the Pipeline Act.

Questions with respect to the procedure may be directed to the ERCB Pipeline Department at 297-8366 or to Alberta Transportation and Utilities Design Engineering Branch Utilities and Engineering Section at 427-3177 or to the appropriate County or Municipality.

E. J. Mink
Vice Chairman
Energy Resources
Conservation Board

M. A. Kehr
Senior Assistant Deputy Minister
Alberta Transportation and
Utilities

ATTACHMENT 1 TO IL 91-4

PROCEDURE FOR REVIEW OF CONCRETE SLAB INSTALLATIONS

The procedure commences with a proposal for highway or road development which interacts with a pipeline and for which a concrete slab installation may be suitable.

1. **The road authority** sends the proposal to pipeline company and requests company to design slab installation to satisfy the authority's requirements and the requirements of CSA Standards Z183 or Z184 for pipe stress limitations.

2. **Pipeline Company** submits design of slab installation and cost estimate to the road authority, or advises that a slab installation is not acceptable and the reasons why, and provides detail and cost estimates for alternative design. The company may use the slab design of Attachment 2 if it is satisfied as to its suitability.

If a slab installation is acceptable to the company:

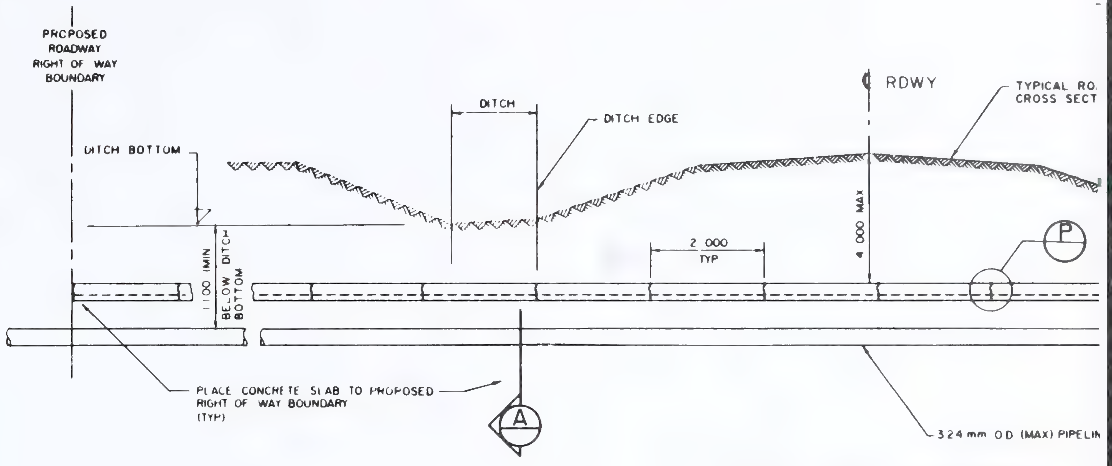
3. **The road authority** reviews slab design, adds to project drawings, and sends six prints to pipeline company.

4. **Pipeline Company** checks prints and sends five approved prints to the Board's Pipeline Department.

5. **Board Pipeline Department** checks compliance to CSA Z183 or Z184. If acceptable, returns two approved prints to company and forwards two approved prints to the road authority. Retains one print.

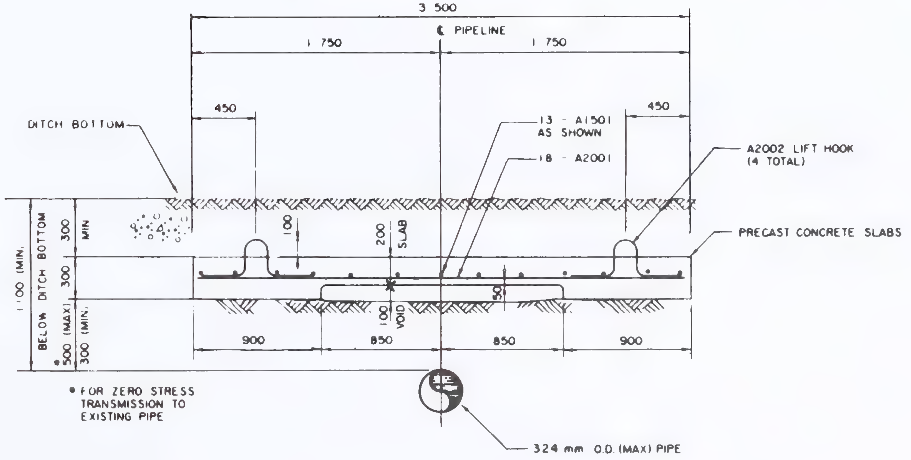
Note: 1. The CSA Standards require an engineering analysis of all loads expected to be imposed on the pipeline and set maximum allowable combined stresses.

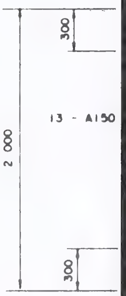
2. Road improvements over pipelines are subject to the issuing of a road crossing agreement by the pipeline company.



TYPICAL PIPE CROSSING

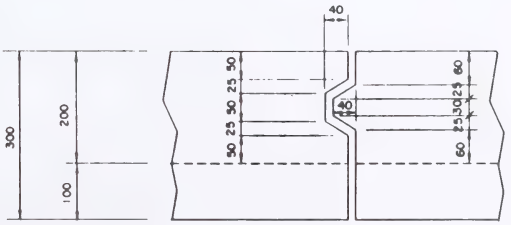
1:50





A SECTION

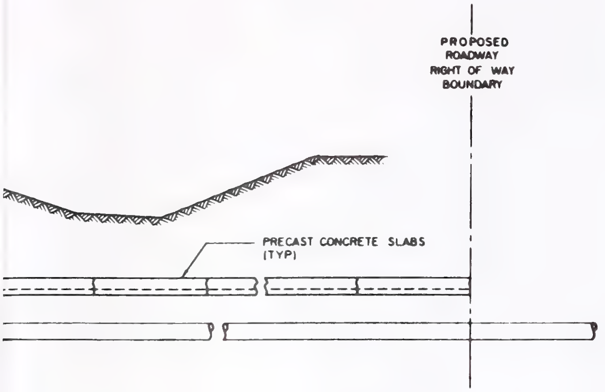
1:20



P DETAIL - SHEAR KEY

(TYP FULL LENGTH OF SLAB) 1:5

ATTACHMENT 2 TO IL 91-4
(Transportation and Utilities, Drawing No. S-1494)


PROPOSED ROADWAY RIGHT OF WAY BOUNDARY
PRECAST CONCRETE SLABS (TYP)

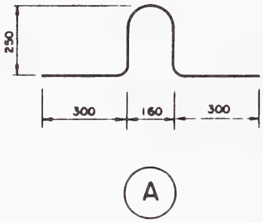
BAR LIST: 1 - SLAB

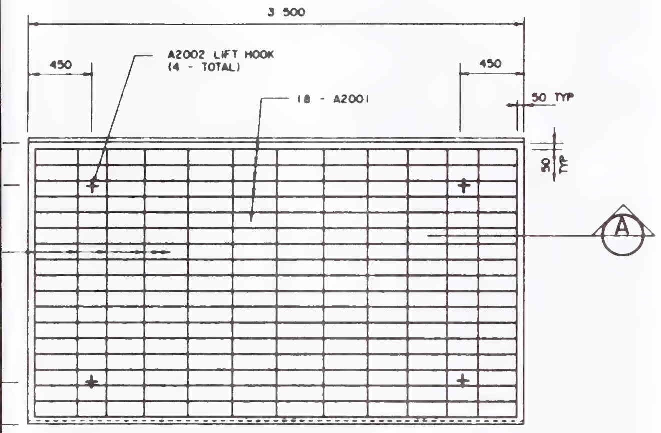
MARK	SIZE	NO	TYPE	X	Y	LENGTH	MASS
A1501	15	13	STR			1 900	39
A2001	20	18	STR			3 400	144
A2002	20	4	A			1 190	11

TOTAL kg: 194

BAR TYPES

(ALL BAR DIMENSIONS ARE OUT TO OUT)





PLAN - PRECAST SLAB

1:20

GENERAL NOTES

- ALL DIMENSIONS ARE GIVEN IN MILLIMETRES UNLESS NOTED OTHERWISE.
- DESIGN
  STRUCTURAL DESIGN IS IN ACCORDANCE WITH CAN/CSA-S6-88 "DESIGN OF HIGHWAY BRIDGES".
  DESIGN LIVE LOAD = CS 750 TRUCK (22.9 tonne AXLE)
  DESIGN DEAD LOAD = 4 METRE FILL AT 20 kN/M^3 + SLAB WEIGHT
  EFFECTIVE SLAB SPAN = 2.6 METRES
  MAXIMUM SOIL BEARING PRESSURE UNDER SLAB = 190 kN/M^2
- CONCRETE STRENGTH @ 28 DAYS SHALL BE 30 MPa.
- ALL REINFORCING STEEL SHALL HAVE 50 mm CLEAR COVER.
- REINFORCING STEEL SHALL CONFORM TO CSA G30.12-GRADE 400.
- ALL CORNERS SHALL HAVE A 20 mm CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ESTIMATED WEIGHT OF 1 - SLAB PANEL = 4.2 Tonnes.
- ALBERTA TRANSPORTATION AND UTILITIES DOES NOT ASSUME ANY LIABILITY FOR THE USE OF THE SLAB. IT IS THE RESPONSIBILITY OF THE PIPELINE DESIGNER TO SATISFY HIMSELF THAT ALL CODES AND SAFETY REGULATIONS ARE MET AND THE SLAB IS USED IN AN APPROPRIATE MANNER.

REINFORCING STEEL	kg	194	
CONCRETE	m^3	1.76	
ITEM	UNIT	ESTIMATE	AS CONSTR

QUANTITY ESTIMATE: 1 - SLAB

REV	DATE	REVISIONS	BY
7			
6			
5			
4			
3			
2			
1			

APPROVED
EXECUTIVE DIRECTOR
BRIDGE ENGINEERING
DATE JAN 21, 1991

Alberta TRANSPORTATION AND UTILITIES
BRIDGE ENGINEERING BRANCH

PIPELINE PROTECTION SLAB

DESIGNED	DRAWN	DATE	CHECKED	DATE	STREAM	LOCATION	HIGHWAY	FILE	SHEET	DRAWING
R Y	JFM	90-11-09							1 of 1	S-1494

PLOTTED JAN 21

ERCB

Energy Resources
Conservation Board

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Informational Letter

IL 91-5

TO: All Oil and Gas Operators

31 May 1991

CANADIANA

JUN 10 1991

GOOD PRODUCTION PRACTICE CONVENTIONAL CRUDE OIL POOLS

From time to time, the Board reviews crude oil pools in the province that are subject to rate controls[1] to identify potential candidates for good production practice (GPP). In this particular assessment the Board focused on those pools or parts of pools undergoing pressure maintenance operations and single well (primary depletion) pools that are incapable of producing their penalized MRL. The pressure maintenance schemes/projects proposed for GPP are listed on Attachment 1 and the single well (primary depletion) pools are listed on Attachment 2. Assigning GPP to these pools will simplify administration and may provide increased production flexibility to some pressure maintenance schemes.

Pressure Maintenance Pools

The Board reviewed all pressure maintenance schemes to identify potential GPP candidates. The schemes were reviewed to confirm that the terms and conditions of the pressure maintenance approval are adequately being met, and to confirm that general performance is satisfactory. In particular the Board attempted to ensure that

- scheme voidage is adequately being replaced and reservoir pressure maintained,
- minimum pressure, maximum gas-oil ratio and other special monitoring requirements are being met,
- there are no performance concerns, particularly for newer schemes, that could be aggravated under GPP, and
- gas conservation issues have been addressed and gas conservation implemented where feasible.

The Board proposes to place the 117 schemes listed in Attachment 1 on GPP. The Board expects that each scheme will continue to be operated in a prudent manner, using good engineering principles and in accordance with the Board-approved depletion plan. In cases where a scheme or part of a scheme is not being operated in a satisfactory manner, the Board will take the appropriate action where necessary. For example, non-compliance with voidage replacement requirements on a scheme, pattern, or regional basis may result in the assignment of an MRL commensurate with the ability to replace voidage. The Board appreciates that it may be necessary to revise operational strategies and when this occurs, operators are advised to ensure that their pressure maintenance approval is amended to reflect any significant operational changes.

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[1] Rate controls refer primarily to maximum rate limitations (MRLs) and gas-oil ratio penalty schedules. However, voidage replacement requirements in enhanced recovery schemes and special production rates in concurrent production operations or other depletion plans represent special forms of rate controls.

The Board emphasizes that both progress report submission and reservoir pressure testing requirements do not change as a result of these schemes being placed on GPP. Further, any outstanding requests from the Board, dealing with scheme operation/depletion, must continue to be addressed.

Single Well Pools

The Board reviewed single well (primary depletion) pools that are incapable of producing their penalized MRL. Those pools for which a rate control is not considered necessary and where there are no outstanding gas conservation issues, have been identified as GPP candidates. As a result of this review, the Board proposes to place the 922 pools listed in Attachment 2 on GPP for administrative reasons.

General Considerations

The Board periodically reviews the appropriateness of GPP and may rescind GPP where conditions change such that oil and gas conservation are compromised. This would include situations where gas flaring and pressure maintenance feasibility become issues. Further, the appropriateness of GPP may also be reconsidered where concurrent depletion of an associated gas cap occurs without an order of the Board. The Board also advises operators within a given pool to monitor overall operations. Any obvious conservation or equity related problems should be resolved as soon as possible or brought to the Board's attention.

Operators are also reminded that normal spacing regulations apply to wells in GPP pools. Should an affected party raise a valid issue related to an off-target well in a GPP pool, the Board may rescind GPP or assign an MRL to the well against which to apply the off-target penalty factor.

Operators may apply, pursuant to Informational Letter IL 90-3, for GPP status or revisions to rate controls for any pool, but must address the matters of conservation and equity.

The Board proposes to place the pools listed in Attachments 1 and 2 on GPP status commencing 1 August 1991. Operators are asked to consider the impact this proposal may have on their operations and advise the Board in writing no later than 5 July 1991 of specific objections or concerns.

Questions regarding this letter can be directed to the Board's Oil Department at 297-8570.

N. G. Berndtsson, P.Eng.
Manager, Oil Department

ATTACHMENT 1 TO IL 91-5
ENHANCED RECOVERY PROJECTS TO GPP - 1 AUGUST 1991

Pool	Approval No.	Proj. No.
Alderson Upper Mannville R	4687	1
Bantry Pekisko G	5888	1
Bigoray Cardium B	3283	2
	3685	5
Bigoray Ostracod	4186	1
Bigoray Ellerslie D	3401	1
Bigoray Nisku A	2983	1
Bigoray Nisku B	3077*	1
Bigoray Nisku C	4924	1
Bigoray Nisku D	2828	1
Bigoray Nisku E	4872	2
Bigoray Nisku F	4667*	1
Bigoray Nisku G	3022	1
Bigoray Nisku H	3433	1
Bigoray Nisku I	2996	1
Bigoray Nisku K	6332	1
Boundary Lake S. Triassic H	4678	1
	4285	8
	4526	9
Brazeau River Viking D	5644	1
Brazeau River Nisku A	4239*	1
Brazeau River Nisku B	4255*	1
Brazeau River Nisku D	4240*	1
Brazeau River Nisku E	4241*	1
Caroline Cardium E	4175*	4
	5035	7
Carrot Creek Cardium E	4845	1
Carrot Creek Cardium K	5375	1
Chauvin Sparky A	3481	1
Cherhill Banff A	5514	10
	5515	11
Coutts Moulton A	5358	1
Crystal Viking A	5046	1
	4372	2
	4528	3
Cyn-Pem Cardium C	5096	1
Cyn-Pem Cardium D	5156	1
Cyn-Pem Cardium L	4498	1
Cyn-Pem Nisku A	4715	1
Duhamel D-3 B	2561	13
Halkirk Upper Mannville I	5309	1
Hayter Sparky A	6023	1
Horsefly Lake Mannville	2746	1
	2774	2
Judy Creek S Beaverhill Lake	5963	1
Kakwa A Cardium A	6175	1
Keho Bow Island G	4838	1
Lathom Upper Mannville C	2091	4
Little Bow Upper Mannville D	6062	1
Little Bow Upper Mannville G	4719	1
Manyberries Sunburst JJ	4977	1
Medicine River Viking D	4655	1
	5350	2
	4815	3
Medicine River Ostracod A/Glauc D	3432	1
Medicine River Pekisko E	1269	2
Parflesh Upper Mannville G	3112	1
Peavey Blairmore	4841	1
	2241	2
Pembina Keystone Belly River L	1869	16
Pembina Keystone Belly River U	4999	20
	2053	21
	4274	22
	5480	23
Pembina Keystone Belly River X	2516	23
Pembina Keystone Belly River FFF, GGG, K2K, S2S	5298	1
	5792	2
Pembina Cardium L	5209	1
Pembina Ostracod E	4337	1
Pembina Nisku A	5604*	1
Pembina Nisku B	5904	1
Pembina Nisku C	2864	1
Pembina Nisku D	4702*	1
Pembina Nisku E	3579	1
Pembina Nisku F	5483*	2
Pembina Nisku G	5291*	1
Pembina Nisku H	3709	1
Pembina Nisku I	3847	1
Pembina Nisku J	2988	1
Pembina Nisku K	5292*	1
Pembina Nisku L	4279*	1
Pembina Nisku M	4535*	1
Pembina Nisku N	4484	1

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*Miscible Flood Scheme

ATTACHMENT 1 TO IL 91-5
ENHANCED RECOVERY PROJECTS TO GPP - 1 AUGUST 1991

Pool	Approval No.	Proj. No.
Pembina Nisku O	5293*	1
Pembina Nisku P	5290*	1
Pembina Nisku Q	4304*	1
Pembina Nisku R	3909	1
Pembina Nisku S	3910	1
Pouce Coupe S. Boundary A & Charlie Lake B	2593	1
Rainbow Muskeg C	5403	1
Rainbow Muskeg K	5905	1
Rainbow Muskeg S	5421	1
Rainbow Keg River F	5791	10
Rainbow Keg River II	4329*	1
Rainbow Keg River OO	5897	3
Rainbow Keg River PP	4055	1
Rainbow Keg River C2C	1590	1
Rainbow South Keg River B	4323*	1
Ricinus Cardium A	4447	22
Shekilie Keg River III	5431	1
Shekilie Keg River UUU	5509	1
Strathmore Lower Mannville B	6218	1
Turin Upper Mannville H	4863	15
	5390	16
Utikuma Lake Gilwood D	4407	1
Virginia Hills Belloy A	3356	1
Virgo Keg River O	4399	1
Virgo Keg River P	4149	1
Virgo Keg River CCC	4029	1
Virgo Keg River Z2Z	5351	1
Virgo Keg River F4F	5519	1
Virgo Keg River G4G	6238	1
Westpem Nisku A	4242*	3
Westpem Nisku C	4280*	1
Westpem Nisku D	4315*	1
Zama Muskeg Y	2817	3
Zama Keg River TT	5372	1

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*Miscible Flood Scheme

ATTACHMENT 2 TO IL 91-5
POOLS TO GPP - 1 AUGUST 1991

Albright Charlie Lake A
Alderson Arcs B
Alderson Detrital B
Alderson Detrital C
Alderson Detrital I
Alderson Lower Mannville J
Alderson Lower Mannville X
Alderson Lower Mannville HH
Alderson Lower Mannville JJ
Alderson Lower Mannville LL
Alderson Lower Mannville MM
Alderson Lower Mannville NN
Alderson Lower Mannville CCC
Alderson Lower Mannville DDD
Alderson Lower Mannville HHH
Alderson Lower Mannville KKK
Alderson Lower Mannville QQQ
Alderson Lower Mannville C2C
Alderson Lower Mannville D2D
Alderson Lower Mannville I2I
Alderson Lower Mannville J2J
Alderson Lower Mannville L2L
Alderson Upper Mannville J
Alderson Upper Mannville L
Alderson Upper Mannville AA
Alderson Upper Mannville DD
Alderson Upper Mannville EE
Alderson Upper Mannville HH
Alderson Upper Mannville TT
Alderson Upper Mannville AAA
Alderson Upper Mannville GGG
Alderson Upper Mannville HHH
Alderson Upper Mannville PPP
Alexander Wabamun C
Alexander Wabamun E
Amber Keg River R
Amber Keg River CC
Amber Muskeg C
Amigo Keg River B
Ante Creek Nordegg A
Armada Upper Mannville A
Armada Upper Mannville F
Astotin Viking H
Atlee-Buffalo Glauconitic E
Bantry Detrital C
Bantry Mannville O
Bantry Mannville Z
Bantry Mannville GG
Bantry Mannville KK
Bantry Pekisko C
Bantry Pekisko J
Bantry Pekisko K
Bantry Sunburst A
Belloy Belloy B
Belloy D-1 A
Belloy D-1 G
Belloy D-1 P
Bellshill Lake Blairmore G
Bellshill Lake Blairmore I
Bellshill Lake Ellerslie D
Bigoray Ellerslie A
Bigoray Ellerslie E
Bigstone Cardium B
Bigstone Cardium C
Black Keg River C
Bolloque Upper Mannville G
Bow Island Lower Mannville E
Brazeau River Belly River D
Brazeau River Belly River U
Brazeau River Belly River CC & DD
Brazeau River Belly River JJ
Brazeau River Belly River KK
Brazeau River Belly River MM
Brazeau River Belly River NN
Brazeau River Belly River PP
Brazeau River Cardium I
Brazeau River Lower Mannville D
Brazeau River Nisku H
Campbell-Namao Blairmore O
Campbell-Namao Blairmore S
Campbell-Namao Blairmore U
Cardiff Ellerslie B
Caroline Basal Mannville O3O
Caroline Rundle C
Caroline Viking O
Caroline Viking U
Caroline Viking BB
Carrot Creek Cardium DD
Carrot Creek Cardium FF
Carrot Creek Cardium HH
Carrot Creek Lower Mannville V
Carrot Creek Lower Mannville BB
Carstairs Cardium A
Cessford Basal Quartz F
Cessford Basal Quartz I
Cessford Detrital D
Cessford Glauconitic T & Mannville HH
Cessford Mannville RRR
Cessford Mannville L2L
Cessford Mannville O2O
Cessford Mannville V2V
Cessford Mannville Y2Y
Chain Banff D
Chain Banff F
Chain Banff G
Chauvin Colony A
Chauvin South Lloydminster F
Chauvin South Lloydminster J
Chauvin South Sparky M
Chauvin South Sparky CC
Chauvin South Sparky DD
Chedderville Viking B
Cherhill Banff V
Cherhill Detrital A
Cherhill Viking C
Chigwell Mannville H
Chin Coulee Glauconitic A
Chip Lake Rock Creek A
Claresholm Glauconitic C
Claresholm Rundle B
Conrad Sawtooth B
Conrad Sawtooth C
Cornwall Gilwood A
Countess Lower Mannville F
Countess Lower Mannville G
Countess Lower Mannville T
Countess Upper Mannville L
Countess Upper Mannville MM
Coutts Cutbank C
Craigmyle Banff B
Craigmyle Banff F
Craigmyle Banff K
Crossfield East Cardium B
Crossfield East Cardium F
Crossfield Rundle J
Crossfield Rundle M
Crossfield Viking C
Crossfield Viking E
Crystal Belly River A
Culp Granite Wash A
Cygnet Ellerslie C
Cygnet Ellerslie M
Cygnet Glauconitic E
Cygnet Viking H

ATTACHMENT 2 TO IL 91-5
POOLS TO GPP - 1 AUGUST 1991

Cygnet Viking Q
Cyn-Pem Belly River A
Cyn-Pem Cardium N
Davey Belly River G
Dawson Beaverhill Lake A
Dawson Granite Wash B
Dawson Slave Point I
Dawson Slave Point J
Dawson Slave Point K
Dawson Slave Point N
Dawson Slave Point O
Driftpile Gilwood A
Driftpile Slave Point A
Drumheller Lower Mannville M
Drumheller Upper Mannville C
Eaglesham North D-1 E
Eaglesham North D-1 N
Eaglesham North D-1 O
Eaglesham North D-1 P
Eaglesham North D-1 Q
Edgerton Lloydminster F
Edgerton Lloydminster G
Edgerton Lloydminster H
Edgerton Sparky A
Edson Cardium II
Edson Cardium SS
Edson Cardium TT
Edson Cardium UU
Edson Cardium VV
Edson Second White Specks A
Elmworth Doe Creek A
Elnora Upper Mannville E
Enchant Arcs O
Enchant Livingstone C
Enchant Lower Mannville F
Enchant Sunburst B
Enchant Upper Mannville I
Erskine Blairmore G
Erskine Blairmore X
Esther Banff G
Evi Gilwood G
Evi Gilwood H
Evi Gilwood K
Evi Gilwood P
Evi Gilwood W
Evi Granite Wash G
Evi Granite Wash H
Evi Granite Wash I
Evi Granite Wash L
Evi Slave Point D
Evi Slave Point M
Evi Slave Point Q
Evi Slave Point S
Ewing Lake D-2 F
Ewing Lake D-3 B
Farrow Basal Quartz E
Farrow Basal Quartz G
Farrow Bow Island A
Farrow Glauconitic A
Farrow Ostracod A
Fenn West D-2 D
Fenn West D-3 A
Fenn West D-3 B
Fenn West D-3 C
Fenn West D-3 F
Fenn–Big Valley D-3 C
Fenn–Big Valley Upper Mannville A
Ferrier Belly River I
Ferrier Cardium LL
Ferrier Viking D
Ferrybank Banff C
Ferrybank Banff D
Ferrybank Belly River I
Fir Cardium A
Fir Cardium B
Fir Cardium D
Fire Keg River D
Fire Keg River E
Fire Keg River F
Fire Keg River G
Fire Keg River H
Galahad Ellerslie E
Garrington Cardium I
Garrington Cardium O
Garrington Cardium P
Garrington Cardium T
Garrington Cardium U
Garrington Lower Mannville T
Garrington Lower Mannville JJJ
Garrington Nisku A
Garrington Second White Specks B
Garrington Second White Specks E
Garrington Second White Specks F
Garrington Second White Specks G
Garrington Second White Specks H
Garrington Viking J
Garrington Viking L
Ghost Pine Pekisko P
Ghost Pine Upper Mannville LL
Ghost Pine Upper Mannville QQQ
Ghost Pine Upper Mannville E2E
Gift Gilwood D
Gift Gilwood G
Gift Slave Point E
Gift Slave Point J
Gift Slave Point K
Gilby Basal Mannville AA
Gilwood Gilwood B
Gilwood Gilwood C
Gilwood Gilwood G
Girouxville East Gilwood A
Girouxville East Granite Wash A
Glacier Doe Creek A
Gold Creek Doig A
Golden Slave Point B
Golden Spike Upper Mannville D
Gordondale Halfway F
Grand Forks Lower Mannville RR
Grand Forks Sawtooth E
Grand Forks Sawtooth F
Grand Forks Sawtooth G
Grand Forks Sawtooth X
Grand Forks Sawtooth AA
Grand Forks Sawtooth MM
Grand Forks Sawtooth AAA
Grand Forks Sawtooth BBB
Grand Forks Sawtooth NNN
Grand Forks Upper Mannville E
Grand Forks Upper Mannville F
Grande Prairie Charlie Lake B
Grouard Gilwood A
Halkirk East Glauconitic D
Halkirk Lower Mannville G
Halkirk Lower Mannville L
Halkirk Lower Mannville M
Hamelin Creek Triassic B
Harmattan East Cardium C
Harmattan East Cardium D
Harmattan East Cardium E
Hays Arcs F
Hays Arcs H
Hays Arcs L
Hays Lower Mannville G
Hays Lower Mannville I

ATTACHMENT 2 TO IL 91-5
POOLS TO GPP - 1 AUGUST 1991

Hays Sawtooth I
Hays Sawtooth K
Hayter Colony C
Hayter Cummings A
Hayter General Petroleum A
Hayter Sparky C
Hayter Sparky G
Hayter Sparky T
Hayter Sparky V
Hayter Sparky W
Heathdale Glauconitic B
Hercules Wabamun A
High Prairie Gilwood C
High Prairie Gilwood E
High Prairie Gilwood H
High Prairie Gilwood K
High Prairie Gilwood M
High Prairie Gilwood N
High Prairie Gilwood O
Highvale Banff B
Highvale Banff M
Highvale Banff T
Highvale Lower Mannville D
Hooker Jurassic A
Hooker Jurassic B
Hussar Basal Quartz B
Hussar Glauconitic BB
Hussar Glauconitic TTT
Hussar Glauconitic H2H
Hussar Ostracod FF
Hythe Halfway F
Innisfail Belly River C
Jenner Pekisko C
Jenner Upper Mannville HH
Joan Granite Wash A
Judy Creek Beaverhill Lake C
Judy Creek Beaverhill Lake D
Judy Creek South Beaverhill Lake E
Jumpbush Upper Mannville E
Jumpbush Upper Mannville K
Jumpbush Upper Mannville M
Kakwa C Cardium C
Karr Dunvegan C
Kaybob Triassic A
Kidney Keg River D
Kidney Keg River K
Kidney Keg River L
Kidney Keg River O
Kidney Keg River R
Kidney Keg River S
Kidney Keg River T
Kidney Keg River U
Kidney Keg River X
Kidney Keg River AA
Kidney Keg River FF
Kidney Keg River HH
Kidney Keg River JJ
Kidney Keg River MM
Kidney Keg River QQ
Kidney Keg River WW
Kidney Keg River XX
Kidney Keg River YY
Kidney Keg River AAA
Kidney Keg River DDD
Kidney Keg River EEE
Kidney Keg River GGG
Kitty Granite Wash B
Kitty Slave Point D
Kitty Slave Point G
Knappen Lower Mannville H
Knopcik Charlie Lake C
Lacombe Nisku D
Lacombe Nisku G
Lanaway Cardium C
Lanaway Cardium D
Lanaway D-2 A
Lanaway Mannville G
Larne Keg River CC
Larne Keg River D
Larne Keg River G
Larne Keg River S
Larne Keg River Z
Larne Keg River DD
Larne Keg River EE
Larne Keg River FF
Larne Keg River GG
Larne Keg River HH
Larne Keg River KK
Larne Keg River NN
Lathom Upper Mannville D
Leahurst Mannville M
Leckie Upper Mannville B
Leduc-Woodbend Blairmore NN
Leduc-Woodbend D-3 J
Leduc-Woodbend Glauconitic A
Leo Upper Mannville D
Leo Upper Mannville F
Leo Upper Mannville J
Lloydminster Colony O
Lloydminster Cummings G
Lloydminster General Petroleum R
Lloydminster McLaren D
Lloydminster Rex A
Lloydminster Sparky M
Lloydminster Sparky BBB
Lloydminster Sparky GGG
Lloydminster Sparky JJJ
Lloydminster Sparky OOO
Lloydminster Sparky QQQ
Lloydminster Sparky SSS
Lloydminster Sparky UUU
Lloydminster Sparky A2A
Lloydminster Sparky F2F
Lochend Cardium D
Lochend Cardium E
Lochend Cardium F
Lochend Cardium G
Lochend Cardium H
Lochend Cardium I
Lochend Cardium K
Lochend Cardium L
Long Coulee Glauconitic A
Long Coulee Glauconitic G
Long Coulee Glauconitic U
Long Coulee Glauconitic DD
Long Coulee Sunburst F
Loon Granite Wash K
Loon Granite Wash L
Loon Granite Wash M
Loon Slave Point D
Loon Slave Point E
Loon Slave Point I
Lubicon Granite Wash C
Lubicon Granite Wash D
Majeau Lower Mannville D
Majorville Upper Mannville G
Manola Lower Mannville H
Manyberries Sunburst RR
Manyberries Sunburst SS
Manyberries Sunburst WW
Manyberries Sunburst ZZ
Manyberries Sunburst AAA
Matziwin Lower Mannville E
Matziwin Lower Mannville F

ATTACHMENT 2 TO IL 91-5
POOLS TO GPP - 1 AUGUST 1991

McLeans Creek Gilwood D
McLeans Creek Gilwood G
McLeans Creek Gilwood H
McLeod Gething J
Medicine River Basal Quartz HH
Medicine River Cardium A
Medicine River Cardium B
Medicine River D-3 C
Medicine River Pekisko V
Meekwap D-2 B
Meekwap D-2 E
Michichi Banff C
Michichi Banff E
Michichi Banff F
Michichi Banff I
Michichi Banff L
Michichi Banff M
Michichi Banff T
Michichi Banff W
Mikwan D-2 D
Mikwan D-2 F
Mikwan Upper Mannville F
Mikwan Upper Mannville G
Minnehik–Buck Lake Ostracod E and F
Minnehik–Buck Lake Viking D
Minnehik–Buck Lake Viking E
Minnehik–Buck Lake Viking F
Minnehik–Buck Lake Viking I
Minnehik–Buck Lake Viking J
Minnehik–Buck Lake Belly River A
Minnehik–Buck Lake Belly River C
Minnehik–Buck Lake Belly River E
Minnehik–Buck Lake Belly River G
Mirage Doe Creek A
Morgan Lloydminster D
Morgan Sparky B
Morgan Wainwright A
Morinville D-3 D
Morinville D-3 G
Nevis D-3 G
Nipisi Gilwood E
Nipisi Gilwood G
Nipisi Gilwood I
Nipisi Gilwood J
Nipisi Keg River Sandstone H
Nipisi Keg River Sandstone L
Nipisi Keg River Sandstone M
Nipisi Keg River Sandstone O
Nipisi Slave Point C
Nipisi Slave Point D
Norris Lower Viking B
Otter Granite Wash D
Otter Granite Wash J
Otter Granite Wash K
Otter Granite Wash O
Otter Granite Wash T
Panny Keg River B
Panny Keg River F
Panny Keg River G
Panny Keg River I
Panny Keg River J
Panny Keg River K
Panny Keg River M
Panny Keg River Q
Panny Keg River R
Panny Keg River S
Panny Keg River U
Panny Keg River V
Panny Keg River W
Parflesh Upper Mannville D
Pembina Belly River ZZZ
Pembina Belly River B2B & C2C
Pembina Belly River U2U
Pembina Belly River X2X
Pembina Belly River Z2Z
Pembina Belly River B3B
Pembina Belly River G3G
Pembina Belly River P3P
Pembina Blueridge D
Pembina Cardium J
Pembina Cardium K
Pembina Cardium N
Pembina Cardium S
Pembina Ellerslie I
Pembina Glauconitic Y
Pembina Glauconitic BB
Pembina Glauconitic CC
Pembina Glauconitic EE
Pembina Jurassic T
Pembina Jurassic CC
Pembina Nisku T
Pembina Nisku U
Pembina Ostracod K
Pembina Second White Specks A
Pembina Viking F
Pembina Viking I
Penhold Lower Mannville F
Penhold Upper Mannville A
Penhold Viking G
Peoria D-1 A
Peoria D-1 B
Pine Creek Cardium L
Pine Creek Cardium N
Pouce Coupe South Boundary C
Pouce Coupe South Boundary E
Pouce Coupe South Boundary F
Prevo Lower Mannville D
Prevo Lower Mannville E
Prevo Pekisko A
Prevo Viking D
Princess Basal Mannville I
Princess Basal Mannville V
Progress Charlie Lake B
Progress Charlie Lake I
Progress Charlie Lake K
Progress Doig A
Progress Halfway H
Progress Halfway I
Provost Colony G
Provost Cummings G
Provost Cummings J
Provost Cummings P
Provost Cummings T
Provost Cummings CC
Provost Cummings GG
Provost Cummings NN
Provost Cummings OO
Provost Cummings RR
Provost Cummings SS
Provost Cummings TT
Provost Cummings VV
Provost Cummings XX
Provost Cummings YY
Provost Ellerslie F
Provost Ellerslie J
Provost Ellerslie M
Provost Lloydminster M
Provost Lloydminster P
Provost Lloydminster S
Provost Lloydminster V
Provost Lloydminster CC
Provost Lloydminster FF
Provost Lloydminster GG
Provost Lloydminster HH

ATTACHMENT 2 TO IL 91-5
POOLS TO GPP - 1 AUGUST 1991

Provost Lower Mannville C
Provost Lower Mannville E
Provost Mannville T
Provost Sparky A
Provost Sparky C
Provost Sparky D
Provost Upper Mannville E
Provost Upper Mannville III
Provost Upper Mannville KKK
Provost Upper Mannville UUU
Provost Upper Mannville B3B
Provost Upper Mannville F3F
Provost Upper Mannville W3W
Provost Upper Mannville X3X
Provost Upper Mannville A4A
Provost Upper Mannville L4L
Provost Viking V
Puskwaskau D-3 A
Racosta Upper Mannville A
Rainbow Keg River ZZ
Rainbow Keg River CCC
Rainbow Keg River III
Rainbow Keg River JJJ
Rainbow Keg River SSS
Rainbow Keg River UUU
Rainbow Keg River VVV
Rainbow Keg River YYY
Rainbow Keg River S2S
Rainbow Keg River U2U
Rainbow Keg River C3C
Rainbow Keg River G3G
Rainbow Keg River H3H
Rainbow Muskeg P
Rainbow Muskeg EE
Rainbow South Keg River J
Rainbow Sulphur Point R
Randell Slave Point A
Red Coulee Cutbank C
Red Earth Granite Wash K
Red Earth Granite Wash NN
Red Earth Granite Wash VV
Red Earth Granite Wash AAA
Red Earth Granite Wash HHH
Red Earth Granite Wash SSS
Red Earth Granite Wash VVV
Red Earth Granite Wash WWW
Red Earth Granite Wash XXX
Red Earth Granite Wash YYY
Red Earth Granite Wash B2B
Red Earth Granite Wash C2C
Red Earth Granite Wash D2D
Red Earth Granite Wash E2E
Red Earth Granite Wash F2F
Red Earth Granite Wash H2H
Red Earth Granite Wash J2J
Red Earth Granite Wash K2K
Red Earth Granite Wash L2L
Red Earth Granite Wash M2M
Red Earth Granite Wash N2N
Red Earth Granite Wash P2P
Red Earth Slave Point U
Red Willow Camrose C
Red Willow Camrose E
Red Willow Lower Mannville L
Retlaw Mannville NNN
Retlaw Mannville OOO
Retlaw Mannville G2G
Retlaw Mannville P2P
Retlaw Mannville T2T
Ribstone General Petroleum A
Ribstone Lloydminster A
Ribstone Nisku E
Rich Winnipegosis A
Richdale Upper Mannville S
Ricinus Cardium LL & RR
Ricinus Cardium VV
Ricinus Cardium XX
Ricinus Cardium HHH
Riviere Wabamun A
Rockyford Lower Mannville F
Rockyford Lower Mannville G
Ronalane Sawtooth A
Ronalane Sawtooth T
Rumsey Glauconitic H
Saddle Hills Charlie Lake E
Saddle Hills Halfway A
Salt Creek Slave Point A
Sawn Lake Slave Point L
Sawn Lake Slave Point M
Seal Slave Point F
Senex Keg River D
Senex Keg River H
Senex Keg River K
Senex Keg River L
Senex Keg River T
Senex Keg River V
Senex Keg River W
Senex Keg River X
Senex Keg River Y
Senex Keg River Z
Senex Slave Point B & Keg River N
Shadow Gilwood G
Shadow Gilwood I
Shadow Gilwood J
Shadow Gilwood L
Shadow Gilwood N
Shadow Gilwood O
Shadow Gilwood P
Shadow Gilwood S
Shadow Gilwood T
Shadow Granite Wash A
Shekilie Keg River Y
Shekilie Keg River Z
Shekilie Keg River CC
Shekilie Keg River LL
Shekilie Keg River NN
Shekilie Keg River RR
Shekilie Keg River TT
Shekilie Keg River GGG
Shekilie Keg River QQQ
Shekilie Keg River E2E
Shekilie Muskeg H
Shoal Granite Wash A
Shouldice Ellerslie G
Sibbald Nisku A
Simonette Bluesky A
Simonette D-3 B
Sinclair Doe Creek C
Sinclair Doe Creek H
Slave Granite Wash B
Slave Granite Wash D
Slave Granite Wash E
Slave Slave Point Q
Slave Slave Point X
Slave Slave Point CC
Snipe Lake Beaverhill Lake
Snipe Lake Gilwood A
Sousa Keg River C
Sousa Keg River N
Sousa Keg River P
Sousa Keg River Q
Spirit River Doe Creek A
Spirit River Doe Creek E
Spirit River Doe Creek F

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St. Albert–Big Lake D-1 E
St. Anne Nordegg A
Steele Grand Rapids S
Stettler D-3 D
Stettler D-3 E
Stettler D-3 F
Stettler D-3 G
Sturgeon Lake D-3 B
Sturgeon Lake South D-3 D
Suffield Upper Mannville D
Suffield Upper Mannville HH
Suffield Upper Mannville II
Sullivan Lake Banff A
Sullivan Lake Banff C
Swalwell Pekisko E
Swan Hills Beaverhill Lake F
Sylvan Lake Glauconitic H
Sylvan Lake Jurassic N
Sylvan Lake Jurassic FF
Taber Glauconitic A
Taber Mannville P
Taber Mannville R
Taber North Glauconitic H
Taber North Glauconitic J
Taber North Glauconitic K
Taber North Taber U
Taber North Taber V
Taber North Taber W
Taber South Glauconitic B
Taber South Mannville L
Taber South Turner Valley A
Taber Southeast Mannville E
Taber Southeast Mannville F
Tangent D-1 A
Tangent D-1 H
Tangent D-1 M
Tangent D-1 AA
Tangent D-1 GG
Tangent D-1 NN
Three Hills Creek D-2 A
Tindastoll Belly River B
Tindastoll Belly River F
Tomahawk Banff E
Trochu Basal Quartz B
Trout Keg River C
Trout Keg River E
Trout Keg River S
Turin Fish Scale B
Turin Lower Mannville O
Turin Lower Mannville JJ
Turin Lower Mannville LL
Turin Lower Mannville PP
Turin Lower Mannville QQ
Turin Lower Mannville RR
Turin Lower Mannville AAA
Turin Lower Mannville KKK
Turin Lower Mannville LLL
Turin Lower Mannville OOO
Turin Upper Mannville L
Turner Valley Cardium A
Twining Lower Mannville P
Twining Rundle E
Utikuma Lake Keg River P
Utikuma Lake Keg River S
Utikuma Lake Keg River W
Utikuma Lake Keg River Y
Utikuma Lake Keg River Z
Utikuma Lake Keg River AA
Utikuma Lake Keg River BB
Utikuma Lake Keg River CC
Utikuma Lake Keg River II
Utikuma Lake Keg River KK
Utikuma Lake Keg River Sandstone V
Utikuma Lake Slave Point A
Utikuma Lake Slave Point D
Utikuma Lake Slave Point E
Utikuma Lake Slave Point H
Utikuma Lake Slave Point I
Valhalla Boundary K
Valhalla Boundary L
Valhalla Charlie Lake D
Valhalla Charlie Lake I
Valhalla Charlie Lake J
Valhalla Charlie Lake K
Valhalla Charlie Lake M
Valhalla Charlie Lake O
Valhalla Doe Creek N
Verger Mannville F
Verger Upper Mannville F
Viking–Kinsella D-2 H
Viking–Kinsella D-2 J
Virginia Hills Beaverhill Lake C
Virginia Hills Beaverhill Lake D
Virgo Keg River C
Virgo Keg River F
Virgo Keg River N
Virgo Keg River Y
Virgo Keg River VV
Virgo Keg River ZZZ
Virgo Keg River I2I
Virgo Keg River Y2Y
Virgo Keg River A3A
Virgo Keg River U3U
Virgo Keg River X3X
Virgo Keg River Y3Y
Virgo Keg River C4C
Virgo Keg River H4H
Virgo Keg River J4J
Virgo Keg River K4K
Virgo Keg River N4N
Virgo Keg River Q4Q
Virgo Keg River R4R
Virgo Muskeg A
Virgo Muskeg B
Wainwright Nisku E
Wainwright Rex B
Wainwright Sparky F
Wainwright Sparky Y
Wainwright Sparky Z
Watts Banff A
Watts Banff J
Watts Banff L
Watts Banff N
Watts Banff Q
Watts Banff W
Watts Lower Mannville A
Watts Lower Mannville B
Watts Lower Mannville E
Watts Lower Mannville I
Wayne–Rosedale Basal Quartz OO
Wayne–Rosedale Basal Quartz PP
Wayne–Rosedale Basal Quartz QQ
Wayne–Rosedale Basal Quartz RR
Wembley Charlie Lake A
Wembley Charlie Lake B
Wembley Charlie Lake C
Wembley Charlie Lake F
Wembley Doig F
Wembley Halfway U
Westerose Belly River A
Westpem Ostracod A
Westpem Ostracod E
Westpem Second White Specks A
Whitecourt Jurassic K

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Wildmere Lloydminster W
Willesden Green Belly River H
Willesden Green Belly River DD
Willesden Green Belly River JJ
Willesden Green Belly River NN
Willesden Green Belly River QQ
Willesden Green Belly River UU
Willesden Green Belly River WW
Willesden Green Cardium H
Willesden Green Cardium J
Willesden Green Rock Creek F
Willesden Green Second White Specks H
Willesden Green Viking W
Willesden Green Viking AA
Willesden Green Viking BB
Willesden Green Viking DD
Willesden Green Viking EE
Wilson Creek Belly River F
Windfall Bluesky A
Woking Charlie Lake A
Woking Halfway B
Wrentham Glauconitic A
Youngstown Arcs B
Zama Keg River J
Zama Keg River JJJ
Zama Keg River QQQ
Zama Keg River WWW
Zama Keg River YYY
Zama Keg River T2T
Zama Keg River U2U
Zama Keg River Z2Z
Zama Keg River J3J
Zama Keg River O4O
Zama Keg River X4X
Zama Keg River D5D
Zama Keg River L5L
Zama Keg River N5N
Zama Keg River O5O
Zama Keg River P5P
Zama Keg River U5U
Zama Keg River X5X
Zama Keg River Z5Z
Zama Keg River A6A
Zama Keg River F6F
Zama Keg River G6G
Zama Keg River I6I
Zama Keg River L6L
Zama Keg River O6O
Zama Keg River T6T
Zama Keg River U6U
Zama Keg River W6W
Zama Keg River B7B
Zama Keg River C7C
Zama Muskeg J
Zama Muskeg U
Zama Muskeg UU
Zama Muskeg ZZ